STATE OF MAINE DEPARTMENT OF TRANSPORTATION

DESIGN REQUIREMENTS

The precast concrete box culvert shall be designed in accordance with the AASHTO Standard Specifications for Highway Bridges, current edition, by either the Load Factor Design (LFFD) or Load and Resistance Factor Design (LRFD) method. The design live load shall be as follows: MS-22.5 (HS-25) for LFD method, *modified HL-93 Strength 1 for LRFD method. *(modify HL-93 by increasing all wheel loads by a factor of 1.25)

The precast concrete box culvert shall be designed for the following

- 1. Fill height over the structure as shown on the plans.
- 2. Future possible increase in grade over the structure to elevation 135.000 m at the construction centerline.
- 3. Construction loads with a minimum of 450 mm (18") of fill on top of the entire structure.

TRAFFIC DATA

Current (2001) AADT	1770
Future (2021) AADT	2130
DHV - % of AADT	9%
Design Hour Volume	192
% Heavy Trucks (AADT)	
% Heavy Trucks (DHV)	5%
Directional Distribution (DHV)	
80 kN Equivalent P 2.0	46
80 kN Equivalent P 2.5	
Design Speed (km/h)	

HYDROLOGIC DATA

Drainage Area	1812 hectares
Design Discharge (Q50)	23.7 m ³ /s
Check Discharge (Q100)	27.6 m ³ /s
Headwater Elevation (Q50)	131.79 m
Headwater Elevation (Q100)	131.94 m
Discharge Velocity (Q50)	3.26 m/s
Discharge Velocity (Q100)	3.43 m/s
Discharge Velocity (Q1.1)	1.72 m/s
Headwater Elevation (Q1.1)	130.25 m
Discharge(Q1.1)	3.5 m ³ /s
· · · · · · · · · · · · · · · · · · ·	•

UTILITIES

Adelphia Communications Corp., Verizon Maine Public Service Company

MATERIALS

Precast Concrete Box Culvert		_ Class "P"
All Other Concrete		_ Class "LP"
Reinforcing Steel	ASTM A 615/A 615M	, Grade 420

BASIC DESIGN STRESSES

Precast Concrete Box Culvert	f 'c = 35 MPa
All Other Concrete	$f'c = 35 MPa$
Reinforcing Steel	f y = 420 MPa

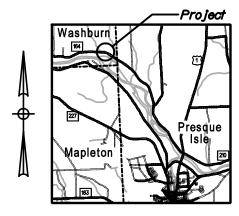
MAINTENANCE OF TRAFFIC

One lane of traffic 3.3 m wide shall be maintained at all times during construction using temporary traffic signals.



CHURCHILL BROOK BRIDGE **OVER** CHURCHILL BROOK IN THE TOWN OF **WASHBURN** AROOSTOOK COUNTY

PROJECT LENGTH 0.070 km **BRIDGE REPLACEMENT BRIDGE NO. 3630**



LIST OF DRAWINGS

Title Sheet	1
Quantities & Notes	2
General Plan	3
Profile	4
Foundation Survey	5
Cross - Sections	6-8
Staged Construction	9
Box Culvert Details	10
Reinforcing Steel Schedule	11
Right of Way Man	

All work contemplated under this contract shall be governed by and be in conformity with the Standard Specifications (Revision of April 1995), the Standard Details (April 1997), The Supplemental Specifications and Supplemental Standard Details for Construction (February 1, 2001) thereto, except as modified by the plans or specifications special

A hydrologic report of the bridge site is available for the Contractor's reference at the Bridge Design office in Augusta. The hydrologic report is based on the Department's interpretation of information obtained for the subject site. No assurance is given that the information or the conclusions of the report will be representative of actual conditions at

> STATE OF MAINE DEPARTMENT OF TRANSPORTATION

APPROVED:

COMMISSIONER

CHIEF ENGINEER

DATE

CASNELL ENGINEERING, P.A.

627.71	100 mm Solid White Pave Marking Line	140	m
627.73	100 mm Solid Yellow Pave Marking Line	70	m
629.05	Hand Labor, Straight Time	80	мн
631.12	All-Purpose Excavator (Inc Operator)	40	HR
631.14	Grader (Including Operator)	40	HR
631.15	Roller Earth Base Crs (Inc Op)	40	HR
631.172	Truck-Large (Inc Operator)	80	HR
637,071	Dust Control	1	LS
639./9	Field Office Type B	1	EΑ
652.39	Work Zone Traffic Control	1	LS
656.75	Temp. Soil Erosion and Pollution Control	1	LS
657.24	Seeding Pits	4	UN
659.10	Mobilization	1	LS

ESTIMATED QUANTITIES

OUANTITY

580

120

400

420

RI.

375

280

(37 m²)

(145 m³)

UNIT

m³

m³

m³

m³

m³

Mg

Мд

Mg

LS

kg

kg

LS

LS

LS

EΑ

LS

LS

EΑ

EΑ

m

m

m

ΕA

EΑ

m³

m²

m³

UN

UN

m²

DESCRIPTION

TEM NO.

203,20 Common Excavation

403.208 Hot Mix Asphalt, I2.5 mm

206.082 Str Earth Excavation-Major Structures

502.49 Structural Concrete Curbs and Sidewalks

403.2/3 Hot Mix Asphalt I2.5 mm Nominal Max. Size, Base

304.10 Aggregate Subbase Course - Gravel

403.209 Hot Mix Asphalt, 9.5 mm(Swks, etc.)

5/4.06 Curing Box for Concrete Cylinders
5/5.2/ Protective Coating for Concrete Surfaces

606.265 Terminal End- Single Rail- Galv Steel

606.60 Guardrail Type 3 - Over 4.5 m Radius

606.74 Gr Tp 3 - Single Rail Bridge Mounted

606.76 Modified Eccentric Loader Terminal

6/3.329 Extended Use Erosion Control Blanket

618.1401 | Seeding Method Number 2 - Plan Quantity

534.7101 Precast Concrete Box Culvert - State Supplied

606.752 Widen Shoulder for Modified Eccentric Loader Terminal

409.15 Bituminous Tack Coat, Applied

503.12 Reinforcing Steel, Fab & Del

503.13 Reinforcing Steel, Placing

508.13 Membrane Waterproofing

511.07 Cofferdam: Upstream

511.07 Cofferdam: Downstream

606.35 Guardrail Delineator Post

610.08 Plain Riprap

619.1201 Mulch - Plan Quantity

620.58 Erosion Control Geotextile

615.07 Loam

606.55 Guardrail Type 3 - Single Rail

203.24 Common Borrow

203.25 Granular Borrow

METRIC 1. All dimensions are in millimeters unless otherwise noted. 2. All elevations and stations are in meters.

1 MAINE STP-1005(400)X 2

PIN 10054.00

General Construction Notes

- I. All utility facilities shall be adjusted by the respective utilities unless atherwise noted.
- 2. For easements, construction limits and right-of-way lines refer to Right of Way Map.
- During construction, a minimum roadway width of 3 300 mm shall be maintained at all times.
 The materials, excavation, installation, and removal of sheet piling, or other means necessary
 for braced excavations, shall be included in the unit price for item 652.39 Work Zone
 Traffic Control.
- 4. Place a 600 mm wide strip of Temporary Erosion Control Blanket along the top of the riprap.
- All embankment material, except as otherwise shown, shall be granular borrow meeting the requirements of Subsection 703.19, Material for Underwater Backfill.
- The clearing limits as shown on the plans are approximate. The exact limits shall be determined in the field by the Engineer. Payment shall be incidental to Contract items.
- 7. Place loam, 50 mm deep, on side slopes between limits of work.
- 8. Do not excavate for Aggregate Subbase Course where existing material is suitable as determined by the Engineer. Payment for shaping and compacting of the existing subbase and layers of new subbase ISO mm or less thick, in areas where the Engineer directs the Contractor not to excavate to the subgrade line shown on the plans, will be made in accordance with Section IO9 of the Supplemental Specifications.
- 9. Two guardrail delineator posts shall be installed at each leading guardrail end and one at each trailing end.
- IO. Modified eccentric loader terminals shall be installed concurrently with the placement of each section of beam guardrail.
- II. Guardrali shall be installed after base pavement has been installed. Surface pavement course will be placed continuously on all based pavement areas including those under guardrali sections with no joints at the shoulder. Payment for hand work underneath guardrali will be considered incidental to Item 403.208, Hot Mix Asphalt (I2.5 mm).
- 12. Yellow RPMs will be installed on base coat of pavement and after surface coat. Payment will be incidental to pavement items. Final striping will be done a minimum of three weeks after paying of surface.
- 13. Guardrall post length and embedment as shown in the Standard Details shall be modified from the indicated 1830 mm length to 2/30 mm with a 1400 mm embedment.
- 14. Removal of the two existing 1829 mm (6') diameter pipes will not be paid for directly. Removal will be considered incidental to Item 206.082, Structural Earth Excavation Major Structures.

Box Culvert Notes

I. The precast concrete box culvert shall be designed in accordance with the AASHTO Standard Specifications for Highway Bridges, current edition, by either the Load Factor Design (LFD) or Load and Resistance Factor Design (LRFD) method. The design live load shall be as follows:

MS-22.5 (HS-25) for LFD method, "modified HL-93 Strength I for LRFD method. "modify HL-93 by increasing all wheel loads by a factor of 1.25)

The precast concrete box culvert shall be designed for the following load cases:

- I Fill height over the structure as shown on the plans.
- II Future possible increase in grade over the structure to elevation I35.000 m at the construction centerline.
- III Construction loads with a minimum of 450 mm (18*) of fill on top of the entire structure.
- 2. Form a 30 mm V-groove at the front face of vertical contraction and construction joints.
- 3. Reinforcing steel shall have 50 mm concrete cover unless otherwise indicated.
- Granular Borrow shall meet the requirements of Subsection 703.19, Material for Underwater Backfill.
- Cover the vertical contraction and construction joints on the back in accordance with the Standard Details. Cover the contraction joints in the top slab in the same manner but without recessing the concrete.
- 6. Concrete used for the culvert shall be class P.
- 7. The construction, handling, and assembly of the precast units shall be in accordance with Special Provision Section 534 Precast Structural Concrete, and with the Manufacturer's Specifications as applicable.
- 8. Install membrane waterproofing over the top and 300 mm down the exterior sides of the precast units.
- 9. The concrete for the precast box shall have a maximum permeability of 3,000 Coulombs.
- IO. The fabrication, delivery and installation of the galvanized steel angle, fasteners and any incidentals will not be paid for directly. Payment will be considered incidental to Item 534.7IOI, Precast Concrete Box Culvert State Supplied.
- II. The hand placed hot mix asphalt behind the concrete curbs shall be paid for under Item 403.209, Hot Mix Asphalt, 9.5 mm Nominal Maximum Size (Sidewalks, Drives,
- 12. Protective Coating for Concrete Surfaces shall be applied to the following areas: All faces of concrete curbs. Tops of Precast Concrete Box Inlet and Outlet walls (sloping) and down 300 mm from

BRIDGE NO. 3630

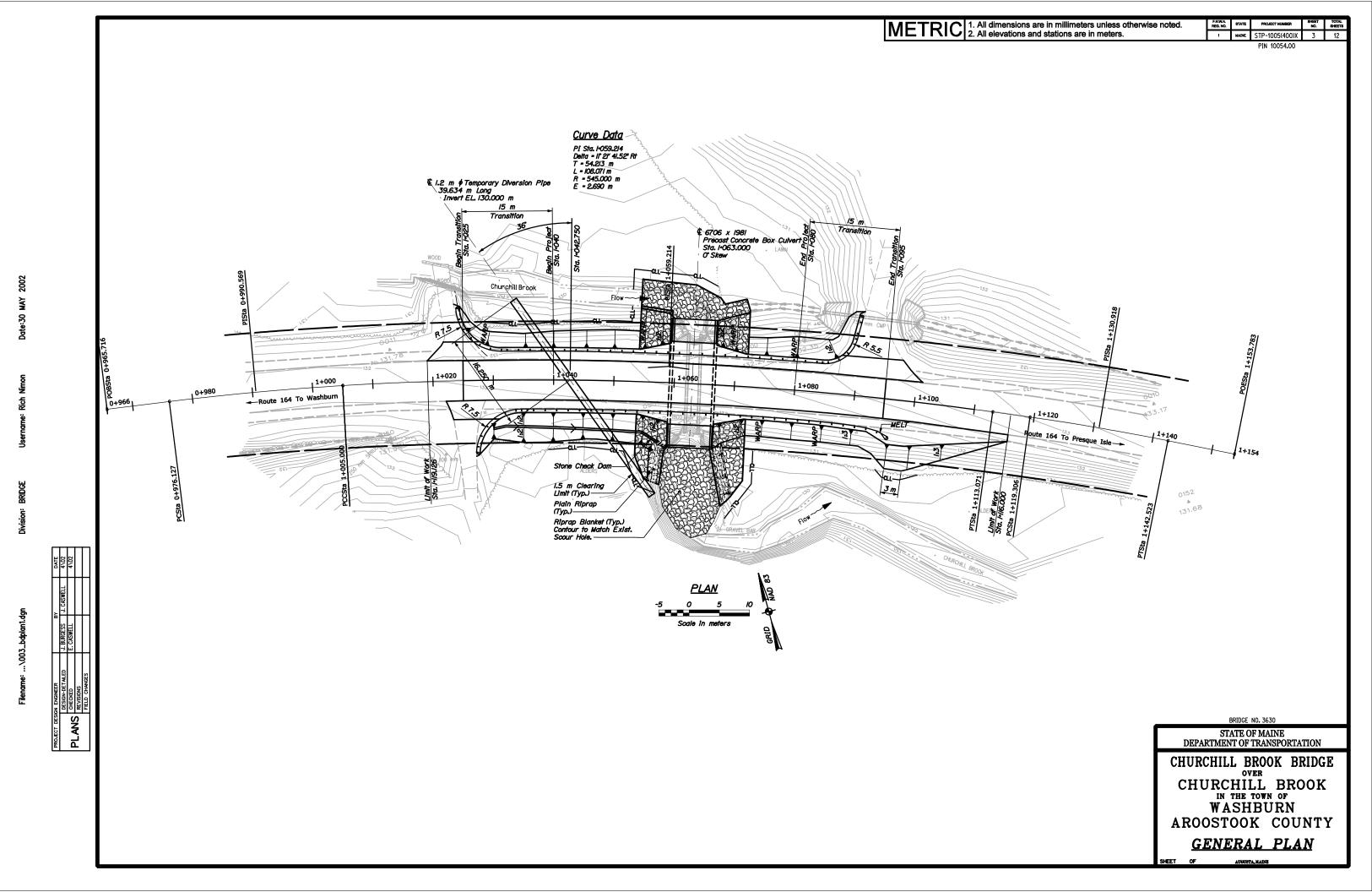
STATE OF MAINE DEPARTMENT OF TRANSPORTATION

CHURCHILL BROOK BRIDGE

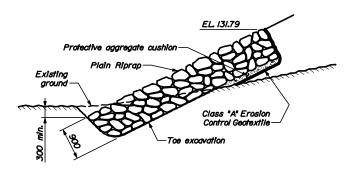
CHURCHILL BROOK
IN THE TOWN OF
WASHBURN
AROOSTOOK COUNTY

QUANTITIES & NOTES

SHEET OF AUGUSTA



PROFILE ALONG & CONSTRUCTION



TYPICAL RIPRAP SECTION

All Bedding Material placed in the embankment slope under the riprap and within 300 mm of the back side of riprap areas shall meet the requirements of Subsection 703.19, Material for Underwater Backfill.

BRIDGE NO. 3630

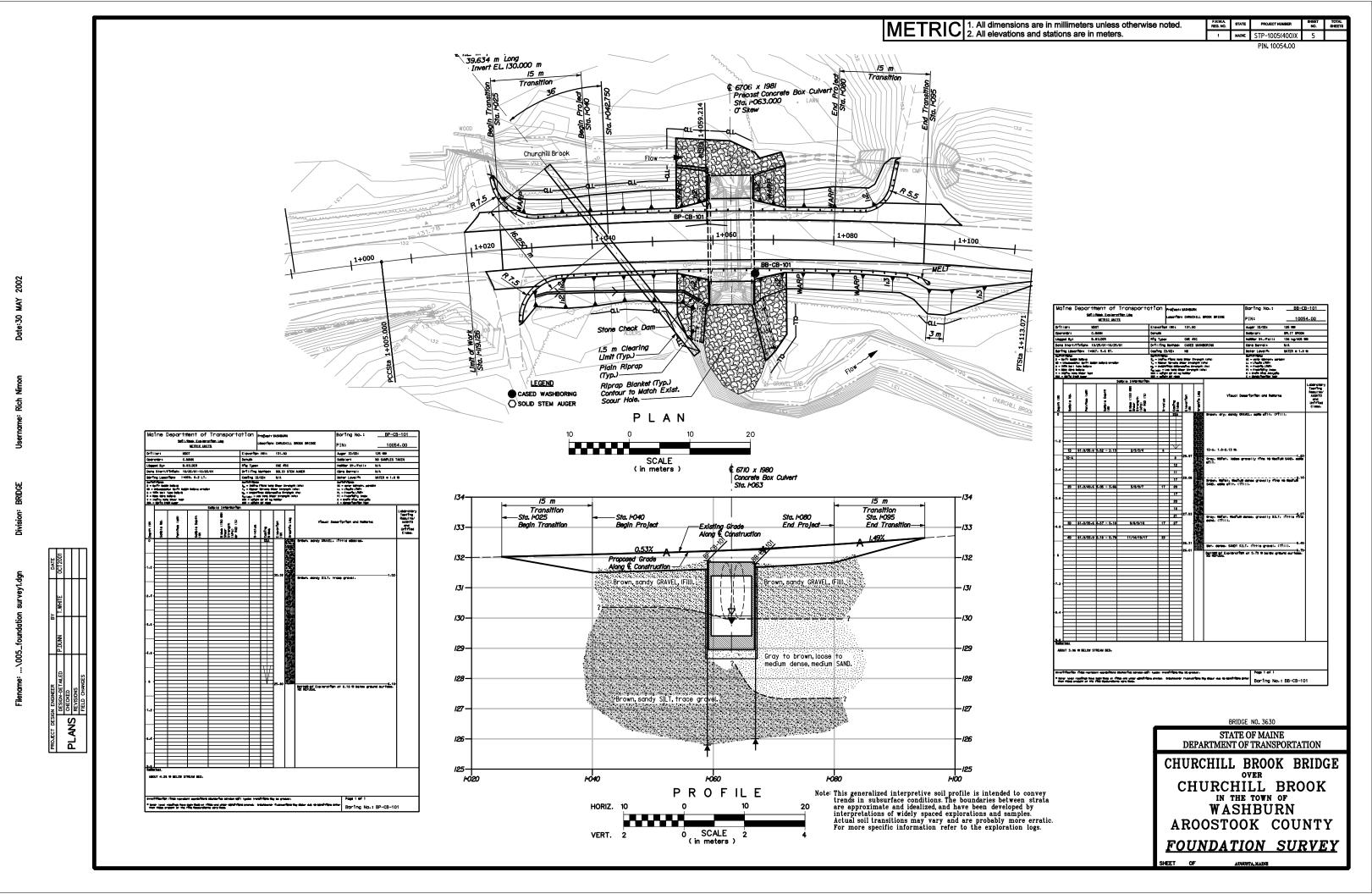
STATE OF MAINE

DEPARTMENT OF TRANSPORTATION

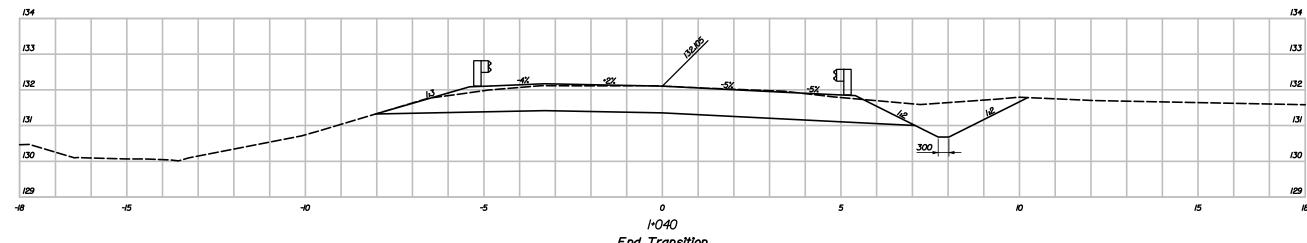
CHURCHILL BROOK BRIDGE OVER CHURCHILL BROOK WASHBURN AROOSTOOK COUNTY

PROFILE

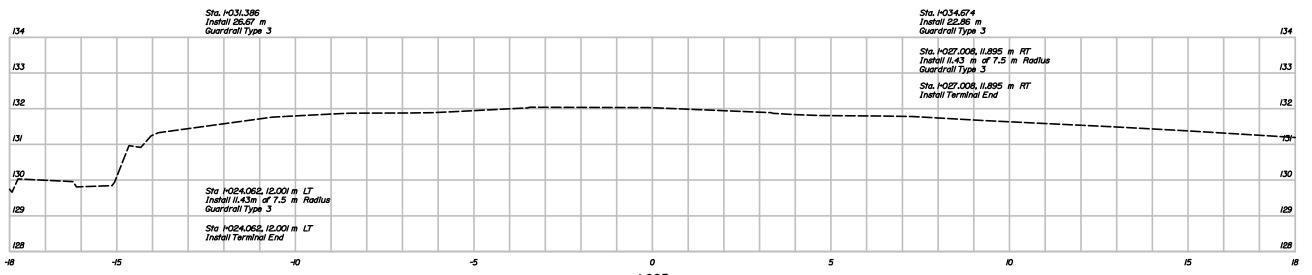




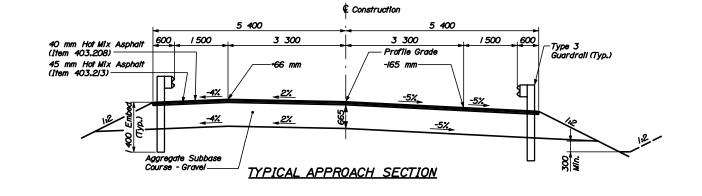








1+025 Begin Transition Match Existing Section



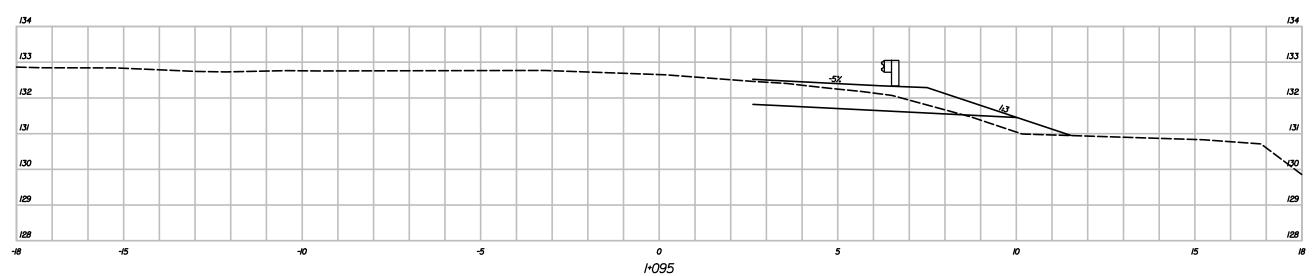
PROJECT DESIGN ENGINEER
DESIGN-DETAILED
OFFICKED
REVISIONS
FIELD CHANGES

PROJECT DESIGN ENGINEER
DESIGN-DETAILED
OFFICKED
REVISIONS
FIELD CHANGES

1050 TO STA. 10TO

PIN 10054.00

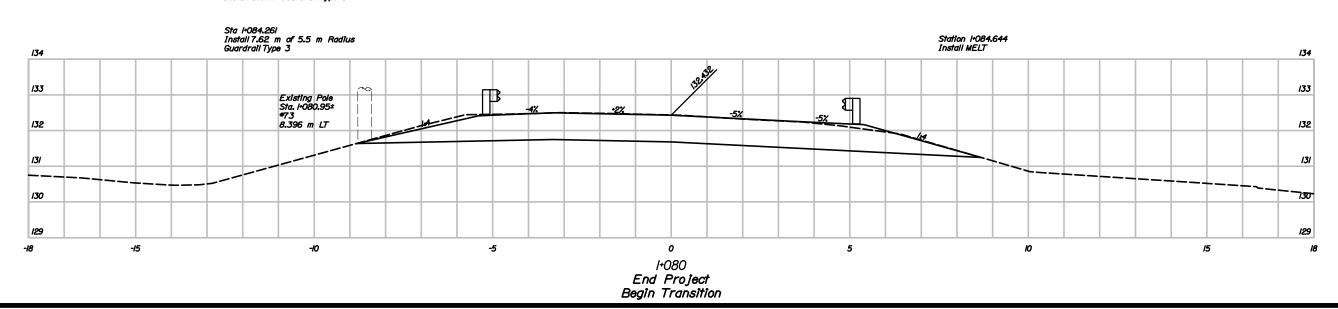
/+//6 **Limit of Work**



Sta. I+090.219, I3.064 m LT Install Terminal End End Transition Match Existing Section Left Widen Shoulder for MELT Right

Sta 1+089.572, 9.312 m LT Install 3.81 m Guardraîl Type 3

PROJECT DESIGN ENGINEER
DESIGN-DETAILED
GHECKED
REVISIONS
FIELD CHANGES



PIN 10054.00

Staged Construction Notes

Stage I

During Stage I, the existing twin 1829 mm (6') diameter pipes shall be braced internally to prevent the pipes from falling. The internal bracing shall be spaced at a maximum interval of 1.5 m along the centerline of the pipe. The bracing shall start at the working line and extend upstream a minimum of 4.5 m. The bracing system shall be approved by the Engineer before be installed. This internal bracing will not be paid for directly. It will be considered incidental to them 652.39 Work Zone Traffic Control.

Maintain one 3.3 m travel lane on existing road.

Downstream: Install 9.144 m of precast concrete box culvert.

Stage II Upstream:

Maintain one 3.3 m travel lane (min. 200 mm fill) on top downstream section of precast concrete box culvert.

Downstream: Install remaining sections of precast concrete box culvert.

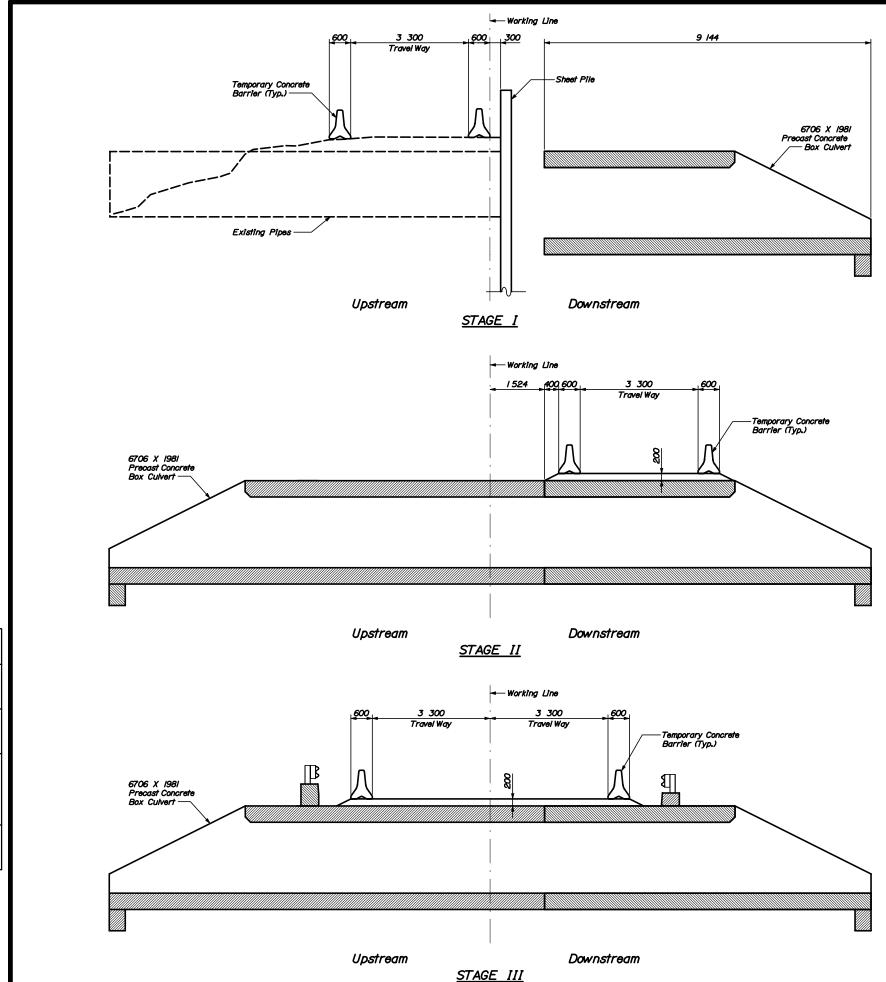
Maintain two 3.3 travel lanes (min. 200 mm fill) on top of Stage III: precast concrete box culvert during installation of cast

In place curbs.

STATE OF MAINE DEPARTMENT OF TRANSPORTATION

CHURCHILL BROOK BRIDGE OVER CHURCHILL BROOK IN THE TOWN OF WASHBURN AROOSTOOK COUNTY

STAGED CONSTRUCTION

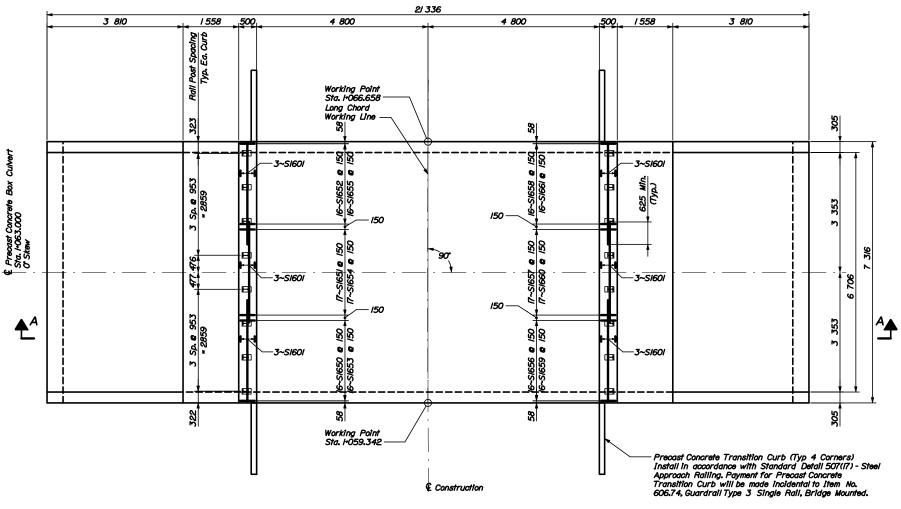


BRIDGE NO. 3630

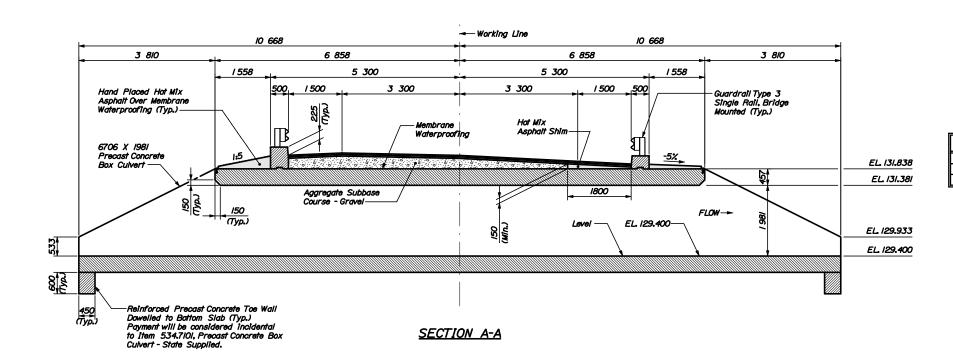
SHEET OF

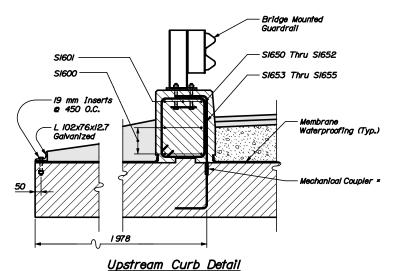
PLANS

PIN 10054.00



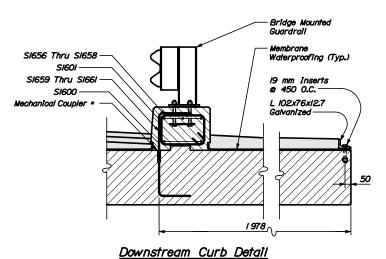
<u>PLAN</u> Reinforcing Steel Not Shown: 6~SI600 (4~Upstream Curb, 2~Downstream Curb)





* NOTE: Payment for Mechanical Coupler with bent bar set in Precast Concrete Box Culvert shall be incidental to Item 534.7(0), Precast Concrete Box Culvert

- State Supplied.



= NOTE: Payment for Mechanical Coupler with bent bar set in Precast Concrete Box Culvert shall be Incidental to Item 534.7(OI, Precast Concrete Box Culvert - State Supplied

Top of Curb Elevations										
	Sta. 1+059.342 Sta. 1+061.171 Sta. 1+063.000 Sta. 1+064.829 Sta. 1+066.65									
Upstream	132.446	132.460	132.475	132.491	/32.508					
Downstream	132.200	132.214	132.229	132.245	132.262					

BRIDGE NO. 3630

STATE OF MAINE

DEPARTMENT OF TRANSPORTATION

CHURCHILL BROOK BRIDGE OVER CHURCHILL BROOK IN THE TOWN OF WASHBURN AROOSTOOK COUNTY

BOX CULVERT DETAILS

SHEET OF

REINFORCING STEEL SCHEDULE

METRIC 1. All dimensions are in millimeters unless otherwise noted 2. All elevations and stations are in meters.
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	1. All dimensions are in millimeters unless otherwise noted.
ı	All elevations and stations are in meters.

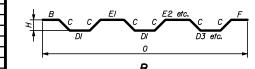
F.H.W.A. REG. NO. STATE PROJECT NUMBER SHEET TOTAL NO. SHEETS 1 MAINE STP-1005(400)X

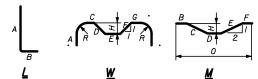
			STRAIGHT	BARS			
MARK	QTY.	LENGTH	LOCATION	MARK	QTY.	LENGTH	LOCATION
S/600	6	7210	Curb				
SI60I	18	2820	Curb				
				, and the second			
MARK	OTY.	LENGTH	LOCATION	MARK	OTY.	LENGTH	LOCATION

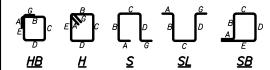
BENT BARS														
MARK	QTY.	LENGTH	TYPE	A	В	С	D	E	F	G	Н	0	R	LOCATION
SI650	16	2050	Н	140	378	507	378	507	-	140	-		-	Curb
SI65I	17	2088	Н	140	378	526	378	<i>52</i> 6	•	140	-	•	-	Curb
SI652	16	2/32	Н	140	378	5 48	378	548		140	-		-	Curb
SI653 *	16	867	L	607	260	-	-	-	•	-	-	•	-	Curb
SI654 ×	17	886	L	626	260		-	-		-	-		-	Curb
SI655 *	16	908	L	648	260	-	-	-	•	-	-		-	Curb
SI656	16	1558	Н	140	378	261	378	261		140	-		-	Curb
SI657	17	1596	Н	140	378	280	378	280		140	-		-	Curb
SI658	16	1638	Н	140	378	301	378	301	•	140	-	•	-	Curb
SI659 ×	16	621	L	361	260		-	-		-	-	-	-	Curb
S1660 ×	17	640	L	380	260	•	•	-	•	-	-	•	-	Curb
SI66I ×	16	661	L	401	260	-	-	-	-	-	-	-	-	Curb
														·
·		, and the second	, in the second	·	, and the second	, and the second	, in the second	, and the second	, and the second	, and the second	, in the second	, and the second		
MARK	QTY.	LENGTH	TYPE	A	В	С	D	E	F	G	Н	0	R	LOCATION

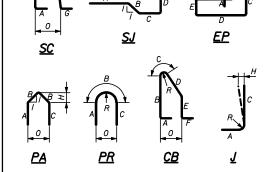
NOTE:
Bars marked with an asterisk (=) have been sized to provide a 50 mm embedment
Into Mechanical Couplers (Leg "A"). Adval End Treaments for these bars shall be determined
by the Contractor to accommodate final Mechanical Coupling System. Payment for Bar End
Treatments to accommodate Mechanical Coupling shall be considered incidental to related
contract items.

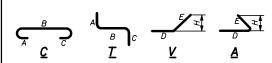
TYPE - BENDING DIAGRAMS











All dimensions are out-to-out of bar.

Bending details and hooks shall conform to the recommendations of the current revision of ACI Standard 318.

Reinforcing Bar: ASTM A615/A615M, Grade 420

GENERAL NOTES

Mark "A1602" = bar size *16 Mark "P2501" = bar size *25 Mark "S1950" = bar size *19

Each crank bar, Type B, may be replaced by two (2) straight bars (one top and one bottom) of the same bar size as the crank bar. Payment in either case shall be based on crank bars as schedule on the plans.

BRIDGE NO. 3630

STATE OF MAINE DEPARTMENT OF TRANSPORTATION

CHURCHILL BROOK BRIDGE OVER CHURCHILL BROOK WASHBURN AROOSTOOK COUNTY

REINFORCING STEEL SCHEDULE

SHEET OF

